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10/726,593

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Abdus Suttar Khan

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BUCHANAN, INGERSOLL & ROONEY PC
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EXAMINER

VAN, LUAN V

ART UNIT

PAPER NUMBER

1753

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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3 MONTHS

03/08/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/726,593

Applicant(s)

KHAN ET AL.

Examiner

Luan V. Van

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a): In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 5, 7, 9-13 and 15-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 5, 7, 9-13 and 15-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 29, 2007 has been entered.

Response to Amendment

Applicant's amendment of December 29, 2006 does not render the application allowable.

Status of Objections and Rejections

The rejection of claims 2, 3, 6, 8 and 14 is obviated by Applicant's cancellation.

All rejections from the previous office action are withdrawn in view of Applicant's amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1, 4 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear what the limitation "coating the surface of the airfoil only at different local areas" mean. It is believed the applicant intended the limitation to mean coating the surface at a variety of locations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4, 5, 7, 9-13 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster '205 in view of Allen et al. and Rigney et al. '447.

Regarding claims 1 and 13, Foster '205 teaches a method of depositing a MCrAlY-coating on the surface of a single crystal turbine blade or vane (column 1 lines

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8-12), such as a nickel base superalloy, the method comprising the steps of coating the article only at a local area with the MCrAlY-coating by an electroplated method (column 7 lines 58-62). The gamma/gamma prime and gamma/beta MCrAlY-coating is a product made by the process of electroplating. Since the MCrAlY-coating of Foster '205 is made by the same process as that of the instant claim, the MCrAlY-coating of Foster '205 would be either a gamma/gamma prime or gamma/beta MCrAlY-coating. The instant disclosure fails to disclose any processing conditions that would distinguish the MCrAlY-coating of the instant claims from that of Foster '205. Foster '205 thus meets the limitations of this claim. Foster '205 teaches coating the article only at a local area with the MCrAlY-coating by an electroplated method (column 7 lines 58-62).

Furthermore, replication of the electroplating method at different local areas on the surface of the article is not patentable unless a new and unexpected result is produced.

In addition, Foster '205 teaches:

It has become common practice to coat superalloy components with corrosion resistant material since the superalloy itself will not normally be capable of withstanding the corrosive/oxidative in-service atmosphere.

One practice is to aluminise the superalloy. This is usually accomplished using a so-called pack aluminising process, or by physical vapour deposition. These processes involve diffusion of Al into the superalloy to form aluminides such as NiAl in the case of Ni base superalloys. In service, a surface layer of Al₂O₃ forms to protect the material beneath and this tends to exfoliate due to thermal expansion and contraction. This is gradually repaired by outwardly diffusing Al and finally, when there is no longer sufficient Al to replace exfoliated material at a particular location, the superalloy component will be liable to rapid localised corrosion. Chromium and silicon either together or singly and alone or in addition to aluminium may likewise be diffused into the superalloys to form a surface layer including chromides or suicides. Although reference will be made hereafter mainly to aluminising it should be understood that such references should be interpreted as alternatively referring mutatis mutandis to chromising and/or siliconising. (Column 1 lines 43-65).

Foster '205 differs from the instant claims in that the reference does not explicitly teach coating the MCrAlY-coating directly on the surface, or coating different areas with different coatings.

According to MPEP 2144.04, omission of an element and its function is obvious if the function of the element is not desired. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Foster '205 by omitting the underlying aluminized layer on the substrate if the corrosion protection property of the aluminized layer is not desired.

Nevertheless, Allen et al. teach that the MCrAlY-coating can be formed directly on the substrate (Paragraph 10, Fig. 1a, and Fig. 4).

Rigney et al. '447 teach an "invention [which] provides a gas turbine component that is protected against environmental damage in different locations by different types of protective layers and coatings. The invention recognizes that different regions of the surfaces of the turbine components experience different types of degradation due to the environment, even though the different regions may be separated by a matter of inches or less. The understanding of the performance of different protective layers has progressed to the point that various protective layers may be optimized for performance under these different conditions of environmental damage" (column 1 line 63 -- column 2 line 12).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Foster '205 by depositing the MCrAlY-coating directly on an article as taught by Allen et al., because the MCrAlY-

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coating would prevent corrosion and/or stress corrosion cracking by acting as a barrier between the salt and nickel-based alloy component (Paragraph 10 of Allen et al.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Foster '205 by coating different locations by different types of protective layers and coatings as taught by Rigney et al. '447, because different regions of the surfaces of the turbine components experience different types of degradation due to the environment.

Regarding claims 4 and 5, Foster '205 teaches during the step of coating the article only at a local area with the MCrAlY-coating by an electroplated method the areas not to be coated are masked with wax (column 7 lines 58-62).

Regarding claim 7, the rejection of claim 7 parallels that of claim 1. Furthermore, Foster '205 differs from the instant claims in that the reference does not explicitly teach using the coating for repairing a used coating. Rigney et al. '447 teach that as degradation of the airfoil coatings occur with continuous service, it would be desirable to repair the coating to extend the life of the turbine component (column 9 lines 7-31). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Foster '205 by repairing a coating as taught by Rigney et al. '447, because it would extend the life of the turbine component (column 9 lines 7-31 of Rigney et al. '447).

Regarding claim 9-10, Foster '205 teaches a gas turbine article, including a blade or vane (column 1 lines 9-14) is coated (also see Example).

Regarding claims 11-12 and 17-20, Foster '205 teaches superalloy gas turbine components may be directionally solidified or in the form of single crystal structures (column 1 lines 39-42).

Regarding claim 15-16, Foster '205 teaches a gas turbine article, including a blade or vane (column 1 lines 9-14) is coated (also see Example).

Claims 1, 4, 5, 7, 9-13 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster '205 in view of Allen et al., Rigney et al. '447, and Foster UK App. '466 (assuming the gamma/gamma prime or gamma/beta phase is not an inherent property of the MCrAlY-coating).

The basis for this rejection parallels that given above.

Foster '466 teach "by electrodeposition there can be produced a coating in which particles forming one phase are dispersed in a matrix forming a second phase and such coating has very desirable properties, and surface finish. The composite coating may be contrasted with those produced by spraying techniques" (page 1, lines 60-65). Foster '466 teaches two phases are present in the coating, which suggest that the MCrAlY-coating can be a gamma/gamma prime or gamma/beta MCrAlY-coating. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have recognized that the electrodeposited MCrAlY-coating of Foster '205 is a gamma/gamma prime or gamma/beta MCrAlY-coating as suggested by Foster '466.

Response to Arguments

In the arguments presented on page 9 of the amendment, the applicant argues that Foster '205 discloses that the superalloy will normally not be able to withstand the corrosive/oxidative conditions that the superalloy is exposed to during service, and that Foster '205 does not disclose omitting the intermediate layer comprising aluminum, chrome or silicon formed on the surface of the superalloy; thus eliminating the intermediate layer would make the superalloy components unsuitable for their intended purpose. This argument is unpersuasive, because Foster '205 discloses that the superalloy -- the component itself -- would normally not be able to withstand the corrosive/oxidative conditions, and thus the superalloy requires a protective coating comprising aluminum, chrome or silicon and a MCrAlY-coating. This does not support applicant's conclusion that eliminating the intermediate layer would make the superalloy components unsuitable for their intended purpose. The examiner acknowledges that Foster '205 does not explicitly teach eliminating the step of aluminizing, chromizing or siliconizing. However, as stated above, Foster '205 teach that aluminizing protects the superalloy component from the corrosive effect of the atmosphere. Thus, according to MPEP 2144.04, omission of an element and its function is obvious if the function of the element is not desired. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Foster '205 by omitting the underlying aluminized layer on the substrate if the corrosion protection property of the aluminized layer is not desired. The fact that Foster '205 teaches the advantages of having an intermediate layer in addition to the overlay coating does not teach a way from eliminating the intermediate layer.

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Nevertheless, Allen et al. teach that the MCrAlY-coating can be formed directly on the substrate (Paragraph 10, Fig. 1a, and Fig. 4). Regarding applicant's argument that Allen et al. do not teach eliminating the step of aluminizing, chromizing or siliconizing the substrate, the examiner respectfully disagrees. Paragraph 10, Fig. 1a, and Fig. 4 shows that the MCrAlY-coating is formed directly on the substrate without the aluminizing, chromizing or siliconizing layer in between the MCrAlY-coating and the substrate.

Applicants' arguments with respect to repairing the coating have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

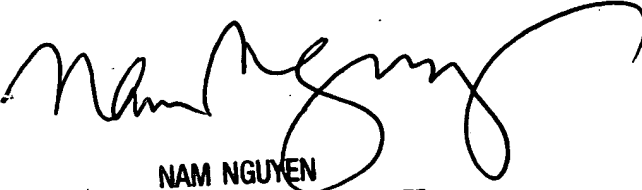
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LWV

March 1, 2007



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